

Course Outline and Syllabus-3D Printing

Instructors Name: Mr. Smith

Email Address: mark.smith@rc255.net

Location: Room 703

Course Description: 3D printing is an additive manufacturing process whereby objects are built up from plastic filament, liquid resin, layers of powder, or even bio-compatible and edible materials. Desktop 3D printing is today's printing press, putting rapid prototyping, customizable products, and individualized medical appliances in reach of the general public. Literacy in basic 3D modeling and manufacturing is an essential skill for future STEM success in this country. In this course students will learn how to be "makers" by using various types of 3D modeling software and imaging equipment, printing actual physical objects that they have designed and modeled themselves, and participating in educational outreach in the university and the community via online ePortfolio. The student will use engineering program like; AutoCAD and Prusas Slicer. The class is designed to prepare students for the world of work, advancement to the local community college, or a four-year university. **Must receive a C or better to advance to other industrial technology classes.**

Materials needed for class: pencil

Activities

Design and manufacture teacher assigned and student designed 3D objects (student cost \$25)

Methods of Instruction:

- Lecture/Demonstration
- Computer work/Email/box.com, weebly.com
- Lab Activities

Student Learning Outcomes:

- Demonstrate knowledge of key historical factors that have shaped manufacturing over the centuries
- Explain current and emerging 3D printing applications in a variety of industries
- Describe the advantages and limitations of each 3D printing technology
- Evaluate real-life scenarios and recommend the appropriate use of 3D printing technology
- Identify opportunities to apply 3D printing technology for time and cost savings
- Discuss the economic implications of 3D printing including its impact on startup businesses and supply chains
- Design and print objects containing moving parts without assembly

General Education Outcome:

- Students will demonstrate the ability to accurately apply correct mathematical methods and techniques in various applications such as contextual sciences, theoretical mathematics, physics, natural sciences and other contextual science.
- Students will demonstrate ability to understand the physical world.
- Students will demonstrate competence in using academic technology including finding, evaluating and utilizing appropriate information sources.
- Students will demonstrate the ability to think critically and analytically.

Graded Assignments & Policies:

Students can correct assigned work, and quizzes, according to the grading comments. The corrected work accompanied by the original work may be resubmitted for consideration of a higher grade. The resubmitted process ends at the end of the final week of class. Grades are based on the individual performance; no curve is applied. If homework is not completed, student will be not be allowed to continue working in the shop until homework is completed.

The grade will be on a percentage system with points assigned to each activity assigned. The following schedule is an estimate of the work that will be include in the final percentage total. Should items be eliminated the same percentages will stand for the adjusted point total. The student's grade is based on the individuals completed and correct work.

Activity/Points	Grading Scale
Quizzes (144 pts.)	100-90 A
Project (600pts.)	89-80 B
ePortfolio (125pts.)	79-70 C
Emails (170)	69-60 D
Completion Grade (125 pts.)	59-F
Final Written & Skills Exam (71 pts.)	

Classroom Polices & Procedures:

Projects will be assigned due dates based on class progress. All homework, quizzes, and tests can be accessed at www.box.com from anywhere in the world. This helps deal with students forgetting their work at school or home. The student can save all completed work to their own drop box folder giving them access to it at home or at school. This class utilizes handouts, drawings, projects, and portfolios as integral learning tools for the student.

Attendance:

Consecutive attendance is crucial to the development of the course materials and work habits. Students are expected to attend each class session. It is the student's responsibility to obtain missed lecture notes, handouts, announcements and assignments from classmates or teacher. Any items assigned for that class are due after however many days the student was excused from class. The lectures in this course build on the previous class lecture; regular attendance is strongly recommended to understand the material taught. The student is responsible for the material taught in a missed class.

No make-ups for missed class activities will be available for unexcused absences and as stated excused absences require that the work be made up in accordance with the student handbook.

Make-up Tests:

Exams each are assigned a point value. Points are awarded for correct answers and demonstrated master of specific skills. Make up testing is allowed at instructor's discretion and in accordance with student handbook.

Students will submit a portfolio of completed assignments chosen from the best examples of his/her homework. This may include work that has been revised/improved since the original grade was given. ePortfolio rubric can be found online in your Box.com class files.

Academic Honor Code:

The objective of the academic honor code is to sustain a learning-centered environment in which all students are expected to demonstrate integrity, honor, and responsibility, and recognize the importance of being accountable for their own academic behavior.

Academic Misconduct:

Reed Custer High School Industrial Technology Department demands the highest standards of personal integrity and honesty. Examples of academic misconduct and plagiarism include copying the assignments (electronic files) of others, or allowing another to copy your work (electronic files); cheating on assignments, quizzes, or test; and other examples as described in the student handbook. All consequences of misconduct will be dealt with in accordance with the student handbook.

Items needed every day for class:

- Pencil

Week 1&2 (First Nine Weeks)

Goal: Introduce the concept of 3D printing
Exercises: Technological shifts throughout history exercise
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 3&4

Goal: From CAD to CAM
Exercises: 3D Printing from CAD to CAM
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 5&6

Goal: Introduction to 3D Modeling
Exercises: Students will construct simple 3D Models
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 7 & 8

Goal: Introduction to setting up 3D Printer
Exercises: Students will set up 3D Printer and prepare 3D model for printing
ePortfolio: www.weebly.com Take picture for portfolio
Quiz: Contextual Math Quiz

Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 9

Goal: Test student knowledge
Exercises: Students will take mid-term test
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 10 & 11 (Second Nine Weeks)

Goal: Create 3D Model of Blum Hardware Jig
Exercises: Student will measure and develop 3D Model of Blum Hardware Jig
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 12&13

Goal: Continue developing 3D Model of Blum Hardware Jig
Exercises: Student will continue to create the 3D Model of Blum Hardware Jig
ePortfolio: www.weebly.com Take picture and write summary of activity
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 14 & 15

Goal: Prepare Blum Jig model for printing
Exercises: Print 3D Model of Blum Jig
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 16 & 17

Goal: Student driven 3D Model
Exercises: Student will develop original 3D Model and Print
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz
Email: Send email to Mr. Smith and Parent(s)/Guardian(s)

Week 18

Goal: Test student knowledge
Exercises: Student will take final exam and Finish ePortfolio
ePortfolio: www.weebly.com Take picture for Portfolio
Quiz: Contextual Math Quiz

Reed-Custer High School-Mr. Smith
Industrial Technology Pre-Engineering Program

www.facebook.com/rchsit
marksmitheducate.weebly.com
mark.smith.educate (Instagram)
www.linkedin.com/in/marksmitheducate

The 3D printing class will cost the student \$25 is due at the end of the second week of class. All projects created in class are the students to take home.

Industrial Technology Program Rules of Conduct

The Industrial Technology program uses both dangerous and expensive equipment; therefore the expectation of behavior in the classroom/shop is higher than the typical classroom. There are eight basic rules and all eight rules relate to shop safety, work skills, and being prepared for class.

Classroom/Shop Rules

1. No horseplay
2. No running
3. No foul language
4. No yelling
5. No behavior that interferes with others learning.
6. Bring necessary items to class (pencil)
7. Must be in seat before bell stops ringing
8. Must log out of all internet software programs at the end of class

Since the potential for injury to the student and the equipment is higher than the traditional classroom setting, the consequences are higher than those found in the student handbook. **The first time or anytime a student does not adhere to the classroom/shop rules; they are assigned a 15 minutes of service work to be served in the shop or classroom. Infractions of a more serious nature will be dealt with on case-by-case basis.** Student's 15 minutes of service work will consist of program related schoolwork, repairing/maintaining shop equipment, maintaining shop cleanliness, or any other school related activity that will help the student and the program. This not only enforces the idea that safety and preparation come first, but also helps enforce expectations with real world consequences and helps build positive ownership in the program. If the student refuses to adhere to the rules they will not be allowed back into the classroom or shop until they do.

The reason for this is simple. If we keep the standard high, the chance of injury or mishap is greatly reduced. I have used this process for years and consequently have never had a serious mishap with a student or piece of equipment.

Please complete the spaces below and return this sheet to Mr. Smith. Student will receive points towards their grade if turned in on time. Student will receive diminished points based on date turned in after due date. If not turned in by end of first week of class, student will not be allowed out into the shop. This document also doubles as a photo release. We market our program and students to aid in developing industry supporters, internship opportunities, and job opportunities for students after high school.

Student

Written Name _____ Email _____

Signature _____ Phone _____

Parent/Guardian

Written Name _____ Email _____

Signature _____ Phone _____